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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 08/845,897
Filing Date: April 28, 1997
Appellant(s): IMAM ET AL.

Joseph T. Grunkemeyer
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 12/21/2007 appealing from the Office action mailed 08/10/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

Appeal No. 2005-2658.

A copy of the Decision on Appeal mailed September 28, 2005 is attached with the Related Appeals Appendix.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,516,592	YANG et al	05-1996
4,605,595	TSANG et al	08-1986

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-4, 7, 11, 19, 22, 23 and 25-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsang et al (US 4,605,595).

Tsang discloses a friction pad comprising an open foam structure of aluminum impregnated with a slurry of an epoxy resin binder, inorganic fillers and/or friction modifiers (column 4, lines 5-17). The "polymeric matrix" itself includes a polymeric binder and inorganic fillers. The slurry itself thus reads on Appellants' polymeric matrix. Tsang discloses the aluminum foam having 93 to 95% open cell structure. Likewise, the friction pad would substantially comprise about 93 to 95 vol% of the slurry so as to completely fill the open cell foam with the slurry. The open cell foam is in the form of a sheet. Note that the term "optionally" indicates that one or more additional components are not required by the claims. Accordingly, Tsang anticipates the claimed subject matter.

Claims 17, 18, 20, 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsang (US 4,605,595).

Tsang does not specifically disclose the pore size distribution. However, it is known in the art that the pore size distribution directly effects the foam properties. Therefore, it would have been within the level of ordinary skill in the art to have used a

uniform pore sized foam, motivated by the desire to obtain a foam having substantially uniform properties along the entire length of the foam. Likewise, it would have been obvious to the skilled artisan to use a foam with gradation of pore sizes, motivated by the desire to obtain a foam with properties that vary along its length.

Tsang does not specifically disclose the composite article containing a plurality of impregnated metal foam sheets. However, the skilled artisan would have found it obvious to form a laminate containing a plurality of like impregnated metal foam sheets motivated by the desire to further enhance the properties exhibited by the use of one impregnated metal foam sheet.

Tsang does not specifically disclose the thickness of the metal foam being no less than 3 times the average diameter of the cells. However, such a variable would have been recognized by one skilled in the art as to enhance the compressive and tensile strength of the metal foam. Alternatively, it would have been obvious to the skilled artisan to prepare a metal foam having a smaller average cell diameter, motivated by the desire to have optimized the compressive, flexural, shear and tensile strength of the resulting impregnated foam. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have optimized either the thickness of the metal foam or the average cell diameter of the metal foam motivated by the desire to enhance the tensile strength and barrier properties of the metal foam since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Claims 1-4, 7, 11 and 17-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al (US 5,516,592) in view of Akiyama et al (US 4,713,277).

Yang discloses a foamed aluminum alloy composite plate comprising an open foam structure of aluminum impregnated with a polymeric composition that contains an epoxy resin, an inorganic powder and a curing agent (example 1). The aluminum foam has a specific density from 0.47 to 0.53 (claim 7). The claims do not preclude the polymeric matrix from having inorganic fillers, the polymeric composition itself reads on the claimed polymeric matrix. Yang does not specifically disclose a porosity of the aluminum foam. Akiyama, however, teaches the aluminum foam having a specific density of from 0.2 to 0.8 and a porosity of 90% (abstract, column 4, lines 5-7). The aluminum foam is lightweight and exhibits excellent sound absorbing property. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the aluminum foam having a porosity of 90% as taught by Akiyama from a practical view of lightweight and excellent sound absorbing property. Likewise, the resulting foamed aluminum alloy composite plate would substantially comprise about 90vol% of the reinforcing composition, which is within the claimed range.

Yang does not specifically disclose the pore size distribution. However, it is known in the art that the pore size distribution directly affects the foam properties. Therefore, it would have been within the level of ordinary skill in the art to have used a uniform pore sized foam, motivated by the desire to obtain a foam having substantially uniform properties along the entire length of the foam. Likewise, it would have been

obvious to the skilled artisan to use a foam with gradation of pore sizes, motivated by the desire to obtain a foam with properties that vary along its length.

Yang does not specifically disclose the composite article containing a plurality of impregnated metal foam sheets. However, the skilled artisan would have found it obvious to form a laminate containing a plurality of like impregnated metal foam sheets motivated by the desire to further enhance the properties exhibited by the use of one impregnated metal foam sheet.

Yang does not specifically disclose the thickness of the metal foam being no less than 3 times the average diameter of the cells. However, such a variable would have been recognized by one skilled in the art as to enhance the compressive and tensile strength of the metal foam. Alternatively, it would have been obvious to the skilled artisan to prepare a metal foam having a smaller average cell diameter, motivated by the desire to have optimized the compressive, flexural, shear and tensile strength of the resulting impregnated foam. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have optimized either the thickness of the metal foam or the average cell diameter of the metal foam motivated by the desire to enhance the tensile strength and barrier properties of the metal foam since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

(10) Response to Argument

Examiner's comments regarding Appellants' issue A:

1. Claims 1-4, 7, 11, 19, 22, 23 and 25-28

Appellants contend that inorganic filler is not part of the volume fraction of polymeric matrix and the recited vol% of the polymeric matrix in the claims refers to the amount of the polymer only. The examiner respectfully disagrees. Nothing in the specification positively discloses that the polymer matrix is limited to the polymer only as asserted by Appellants. The paragraph bridging pages 508-509 of the article "Composite material" *McGraw-Hill Encyclopedia of Science and Technology* (9th ed. 2000) discloses that "the matrix is the body constituent, serving to enclose the composite and give it bulk form. Major structural constituents are fibers, particles, laminae or layers, flakes, fillers and matrices. They determine the internal structure of the composite. Usually they are the additive phase." To the examiner's understanding, the matrix contains fibers, fillers, particles and etc. There is no clear indication that the filler is separate from the polymeric matrix. Tsang discloses a friction pad comprising an open foam structure of aluminum impregnated with a slurry of an epoxy resin binder, inorganic fillers and/or friction modifiers (column 4, lines 5-17). The "polymeric matrix" itself includes a polymeric binder and inorganic fillers. The slurry itself thus reads on Appellants' polymeric matrix. Tsang discloses the aluminum foam having 93 to 95% open cell structure. Likewise, the friction pad would substantially comprise about 93 to 95 vol% of the slurry so as to completely fill the open cell foam with the slurry. Tsang thus teaches the friction pad comprising about 93 to 95 vol% of the polymeric matrix.

2. Claims 23 and 25

The examiner notes that the phrase "consists of" is recited in the claims. However, the phrase "polymeric matrix" is not necessarily referred to the polymer only. Therefore, the "consists of" does not preclude the article from having the inorganic filler and/or friction modifier. Accordingly, the art rejections are sustained.

3. Claims 26-28

The examiner has provided a detailed analysis as to why Tsang discloses 92 vol% to 94 vol% polymeric matrix. The examiner incorporates those arguments by reference. Thus, the examiner respectfully submits that the claims are anticipated by Tsang.

Examiner's comments regarding Appellants' issue B:

Appellants have reiterated positions taken with respect to the other rejections, the examiner's comments set forth above are equally pertinent in the support of these rejections as well.

Examiner's comments regarding Appellants' issue C:

Appellants contend that the present invention requires 60 to 95 vol% polymeric matrix which is limited to the polymer only. In contrast to the present invention, the combined teachings of Yang and Akiyama suggest about 90 vol% of the reinforcing composition which contains inorganic fibers. The examiner respectfully disagrees. Nothing in the specification positively discloses that the polymer matrix is limited to the polymer only. The paragraph bridging pages 508-509 of the article "Composite material" *McGraw-Hill Encyclopedia of Science and Technology* (9th ed. 2000) discloses that "the matrix is the body constituent, serving to enclose the composite and give it

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bulk form. Major structural constituents are fibers, particles, laminae or layers, flakes, fillers and matrices. They determine the internal structure of the composite. Usually they are the additive phase." To the examiner's understanding, the matrix further contains fibers, fillers, particles and etc. Therefore, the 90 vol% of the reinforcing composition would read on the claimed 60-95 vol% polymeric matrix. Substitution of the phase "consists of" for the "comprising" does not exclude the inorganic fillers from the composite material because the "polymeric matrix" itself includes a polymeric binder and inorganic fillers. Accordingly, the art rejections are sustained.

(11) Related Proceeding(s) Appendix

Copies of the court or Board decision(s) identified in the Related Appeals and Interferences section of this examiner's answer are provided herein (Appeal No. 2005-2658).

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Hai Vo/
Primary Examiner, Art Unit 1794

Conferees:

/Rena L. Dye/

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/Romulo H. Delmendo/

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